

Notes on *Graptostethus servus* (Fabr.) in Hawaii (Heteroptera: Lygaeidae)

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My first record of this bug in Hawaii (Proc. Haw. Ent. Soc. 11: 284, 1943) was based on a single specimen, and it was provisionally named *Graptostethus nigriceps* Stål, pending the obtaining of more specimens for further study. Since that time, single specimens have been obtained here and there at widely distributed localities on Oahu, and in some instances quite a concentration occurred, so that now enough specimens are at hand to show a considerable variation in coloration and allow for a more definite consideration of the species. A more intimate study of the 60-odd specimens at hand shows that it cannot be *nigriceps*, for with all the variations in color, none has a black head. The head in all specimens is red, with tylus black and there is more or less black at the posterior margin of the head. In most specimens the black markings on the pronotum are like the figure of *servus* in Fauna of British India (Rhynchota, 2:9, 1904), but there are specimens with pronotum red except for the two round black spots near middle of disc. The hemielytra, too, have mostly the black coloration of the above figure of *servus*. (See also my figure 1.) However, a few specimens have red hemielytra without black markings, except that the membrane is black, and it has a small white spot at basal angle below apex of clavus, and also white apical margin as in *servus*. The rostrum is black and extends to the posterior coxae as in *servus*, not elongate as in *nigriceps* in which the rostrum extends well beyond the posterior coxae. Taking it all in all, it seems safe to call our immigrant bug *Graptostethus servus* (Fabr.) even though it displays a greater variation in color than has been accounted for previously in the literature.

The first specimen of *Graptostethus* to come to notice in Hawaii was a specimen caught in a wind trap in a pineapple field in the Kunia district of Oahu, July 21, 1942, by Mr. K. Sakimura of the Pineapple Research Institute. Subsequently specimens have been taken at various localities on the islands of Oahu and Kauai, as follows:

(All of the following records are for Oahu, unless Kauai is specified)

- 2 Jan. 18, 1943. Honolulu, in package of capsules of *Ipomoea tuberosa* for shipment, (Krauss)

- 2 Jan. 19, 1943, Pacific Heights, in capsules and on foliage of same plant, (Krauss)
- 1 May 15, 1943, Kalihi, on eggplant, (Look)
- 1 May, 1943, Kipapa, on corn, (Pemberton)
- 1 June 20, 1943, 2044 Lanihuli Drive, Manoa Valley, on hibiscus, (Swezey)
- 1 May 31, 1943, Experiment Station, H.S.P.A., on window of entomology laboratory, (Williams)
- 1 July 20, 1943, Experiment Station, H.S.P.A., on window of entomology laboratory, (Williams)
- 1 Dec. 1, 1943, Experiment Station, H.S.P.A., on window of entomology laboratory, (Williams)
- 1 Dec. 29, 1943, Experiment Station, H.S.P.A., on window of entomology laboratory, (Williams)
- 1 Sept. 22, 1943, Experiment Station, H.S.P.A., on unrecorded plant, (Sa Ning)
- 1 Dec. 17, 1943, Kailua, on corn, (Urata)
- 3 Feb. 17, 1944, Experiment Station, H.S.P.A., on *Ipomoea tuberosa*, mostly in old capsules, (Swezey)
- 2 March 3, 1944, Experiment Station, H.S.P.A., on *Ipomoea tuberosa*, mostly in old capsules, (Swezey)
- 1 March 30, 1944, Experiment Station, H.S.P.A., on *Ipomoea tuberosa*, mostly in old capsules, (Swezey)
- 4 May 1, 1944, Experiment Station, H.S.P.A., on *Ipomoea tuberosa*, mostly in old capsules, (Swezey)
- 1 May 13, 1944, Experiment Station, H.S.P.A., on *Ipomoea tuberosa*, mostly in old capsules, (Swezey)
- 1 May 18, 1944, Experiment Station, H.S.P.A., on *Ipomoea tuberosa*, mostly in old capsules, (Swezey)
- 1 June 12, 1944, Experiment Station, H.S.P.A., on *Ipomoea tuberosa*, mostly in old capsules, (Swezey)
- 1 May 1, 1944, McCully Street, Honolulu, (Pemberton)
- 1 May, 1944, Kauai, on flowering *Heliotrope*, (Stephen Au)
- 1 July 23, 1944, Kaimuki, on eggplant, (Nishida)
- 1 July 21, 1944, Waimea, Kauai, on corn, (Davis)
- 1 Aug. 4, 1944, Kuliouou, in trash, (Rosa)
- 2 Aug. 11, 1944, Kuliouou, in trash, (Rosa)
- 1 Sept. 29, 1944, Waianae village, in house, (Hilda Swezey)
- 1 Oct. 13, 1944, Experiment Station, H.S.P.A., in spider web in entomology laboratory, (Williams)
- 1 Oct 14, 1944, Experiment Station, H.S.P.A., (Van Zwaluwenburg)
- 6 Oct 13, 1944, Experiment Station, H.S.P.A., in old capsules of *Ipomoea tuberosa*, (Swezey)
- 1 Nov. 2, 1944, Summit of Mt. Kaala, on *Erechtites*, (Williams)
- 1 Nov. 7, 1944, Grove Farm, Lihue, Kauai, on *Crotalaria* by roadside, (Pemberton)
- 1 Nov. 13, 1944, Experiment Station, H.S.P.A., on *Euphorbia hirta*, (Williams)
- 1 Nov. 21, 1944, Experiment Station, H.S.P.A., on laboratory window, (Williams)
- 1 Nov. 22, 1944, Experiment Station, H.S.P.A., on laboratory window, (Williams)
- 1 Dec. 9, 1944, Experiment Station, H.S.P.A., on laboratory window, (Williams)
- 1 Dec. 17, 1944, 2044 Lanihuli Drive, Manoa Valley, on sweetpotato, (Swezey)

Besides the above records, the bug was captured more abundantly in the wind traps operated by Mr. Sakimura in pineapple fields at

Kunia during 1943 and 1944. On examination of 39 specimens from this source collected June 8, 1943 to August 15, 1944, 18 were found to be of the red form (fig. 1 B) and 21 had the heavy black markings (fig. 1 A). Of the red specimens, half were females and half were males. Of the dark forms, there were 13 females and eight males. About the same proportion of coloration and sex holds for the other specimens at hand. This shows definitely that the difference in coloration is not a sexual character.

In 1943 when an occasional *Graptostethus* was being taken on windows of the entomological laboratory at the Experiment Station, H.S.P.A., attempts were made to discover the probable food-plant of the bug. Feeding was observed on the following when offered at different times separately in cage: tender terminal foliage of hibis-

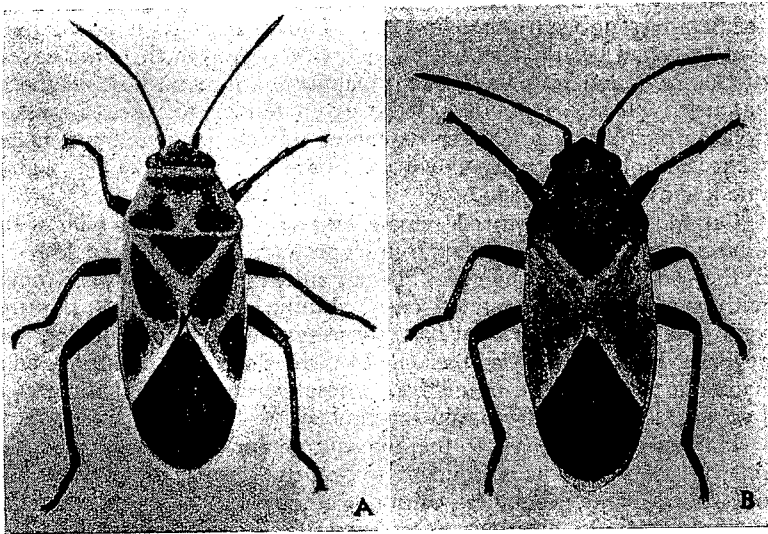


Fig. 1. *Graptostethus servus* (Fabr.).

- A. Form with thorax, clavus and corium red and having black markings. $\times 5$.
 B. Form with thorax, clavus and corium mostly red. $\times 5$.

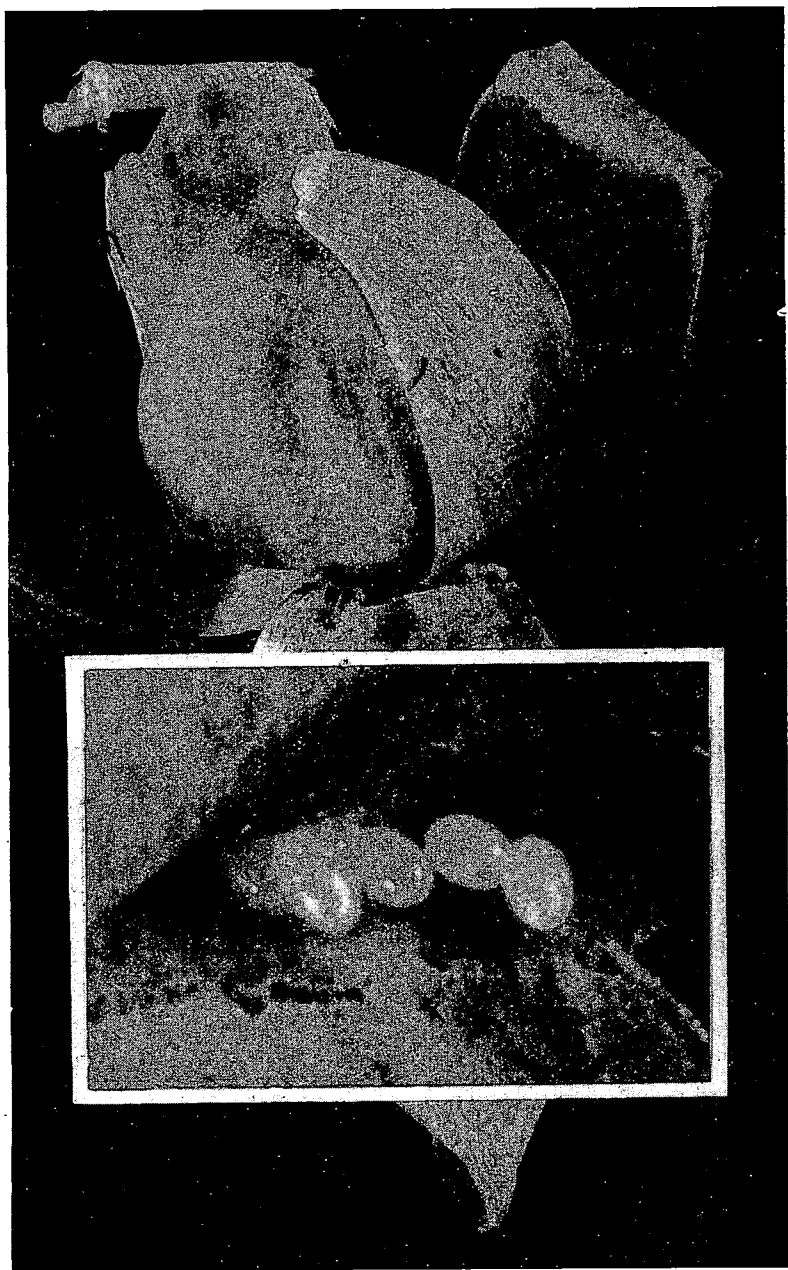
cus and cotton, buds of *Sonchus* and *Emilia*, hibiscus bud and blossoms, *Euxolus*. Feeding was not observed on *Portulaca*, amaranth, sweetpotato, pigeon pea or tender foliage of *Ipomoea tuberosa* Linn. One bug lived for a month under this experimenting.

On Feb. 17, 1944 three adult bugs and one nymph were obtained by sweeping on *Ipomoea tuberosa* vines which are on a fence just outside of the entomological laboratory windows at the Experiment

Station, H.S.P.A. The finding of the nymph on this vine would indicate the probability that this was a food-plant. When the bugs were kept in a glass jar with buds of this plant, no feeding was observed. On March 3, a pair was observed *in cop.* on a dry capsule of the same vine, and a small nymph was found in an old capsule which was split at the base. Then on March 7, four adults were found singly on leaves, also two nymphs, one of which was in the last instar and matured in a few days; and three young nymphs were found between sepals at the base of an old capsule: further evidence that this was the food-plant. Search was made for eggs but none found. On March 11, small nymphs of various sizes were numerous in old capsules, about 40 in one capsule. The capsules were split at the base and gave access to the nymphs which were probably merely hiding there. May 1, two pairs of *Graptostethus*, freshly caught, were placed in a cage with a sweetpotato plant. No feeding was noticed, nor oviposition, but on May 12 it was found that eggs had been placed loosely in a cotton plug in the cloth cover of the cage, and four had already hatched. The next day six more hatched. These young bugs were given tender foliage of sweetpotato for feeding and later on pieces of ripe papaya fruit, none went through to maturity, however. Some died after nine days, and one lived for three weeks.

On May 12, a captured female bug was placed in a vial with hibiscus bud. The next day four eggs were found placed loosely in the cotton plug of the vial. The egg measured 1 mm. by 0.6 mm., with symmetrically rounded ends, shining white with a slightly yellowish tinge. After four days these eggs were light pink; on the seventh day one end was darkened by the developing embryo, and hatching took place in nine days. These were carried on for about two weeks before they finally succumbed.

Having gained a clew to the oviposition, and what the eggs were like, further attempts were made to find the eggs in the open, without success, however. Oviposition was obtained in cages, though, in the following positions. On June 10, a captured female was placed in a jar with new leaves of *Ipomoea tuberosa* and some old dry capsules. On examination a few days later, eggs were found as follows: two on bottom of jar under debris, one on sepal near base, two at base of capsules between it and sepal, nine in a group or cluster where they had been inserted at the base between a dried sepal and the capsule. (See plate.) On June 24, a cotton boll which was split so as to expose the cotton was put in cage with two pairs of bugs. When examined after six days, 30 eggs were found as follows: five in cluster between calyx and capsule at base, two separate on inner surface of a carpel of the capsule, 10 in clusters of five in the exposed cotton, 13 isolated and loose in the cotton.



Graptostethus servus (Fabr.)

Eggs *in situ* at base of *Ipomoea* capsule, $\times 2$; highly enlarged in inset.

Although *Ipomoea tuberosa* is the only plant on which nymphs have been observed, I do not consider that it is the sole food-plant of this bug. The adult bugs have been found on quite a variety of other plants, but, as in each case there was only a single specimen, I do not consider these records as positive indication of food-plant. There is no evidence yet that this bug is becoming a garden pest here. Dr. Fletcher, in "Some South Indian Insects" (p. 482), records *Graptostethus servus* on red-gram (*Cajanus indicus* Spreng.), sweetpotato and jute (*Corchoros*) capsules, but "Scarcely a pest, but may do damage at times".